

Current Problems and the Future of Industry in Insecticide Use and Development

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The problems of industry as related to insect and mite control chemicals have never been greater and the future of industry less certain than at this moment.

This generalization may seem a bit dismal when the statistics show that pesticide use is on the increase in every section of our nation. Why then should I feel concerned if usage continues to increase?

I shall say at this point that problems, opinions, suggestions, and any prognostications as presented in this discussion are the distillation of talks with many prominent industry representatives. I take full responsibility for the controversial subjects. This paper represents not the opinions of top management, but rather those of field managers who daily face the problems of field development and use of pesticides. It is a complex phenomenon, but the potentially adverse results are as inevitable as the proverbial sands of time unless we do something in the near future to overcome our industrial problems.

Let's first review some of the major problem areas as I see them:

1. *Cost of developing and registering a compound.* It is estimated this figure could be 1.5–2.5 million dollars per compound. The cost picture has been belabored too much in the past few years, but it still seems to be greatly misunderstood by many who do not want to understand or feel that ranting against the ogre of big business will reduce the price. I submit for your consideration this question: Where

else in a consumer-oriented industry has a price stayed almost the same as 15 years ago? Did your car price stay at \$1,500 as it was in 1953? Parathion is selling today for about 50 cents less per pound than in 1953! Let me assure you, our labor and production costs have steadily gone up in this period. We have a large investment at our research center in Princeton and more than 500 people work every day in this complex. The risk potential is great and the number of new compounds coming out of all industrial research projects is very nebulous. Of all the compounds that are screened and tested, only a fraction ever reach the fruition of registration. This is true in all of our industry, whether it be insecticides or other pesticides. The competition for research and development dollars in a corporation is acute, and the Agricultural Division has to fight for survival with such exotic things as consumer products, about which a much quicker return for dollars invested can generally be predicted.

2. *Cost of adding a new crop or use to existing labels.* A few years ago I kept an accurate cost accounting of time involved in obtaining one set of residue samples at one location in California. The costs sobered my thinking on residue work. The use was for Cygon on peppers to control aphids. To establish and collect samples, 65 hours of time were involved and 2,000 miles were driven. I gave the time the very conservative figure of \$10 per hour, which adds up to \$650. There was an air-shipment cost of \$128 for the residue sample and approximately \$750 cost to run

¹ From a talk given at the Dallas meeting of the Entomological Society of America on Dec. 2, 1968.

the 30 residue samples in our present laboratory. These figures add up to more than \$1,500. Keep in mind that these figures apply to our work in about nine other locations as well, which would total approximately \$15,000 for one single registration on one insect. With good luck we'll get by with this number of tests, but we may have to expand this testing over a longer period and many new locations. This is research for what I would consider a minor crop. Of course, we have to do as much research on a minor crop in most instances as we do on a major one such as cotton. This poses a real problem. Where do you spend your time, effort, and money to obtain registrations for promising compounds?

Naturally, much time will be spent on the major crops, often leaving smaller or secondary crops without proper materials for crop protection. In many areas this problem has become acute in the past few years because the general feeling has been that, with our limited manpower, time, and profit potential, we must expend our efforts in large crop potentials. I think we haven't adequately coped with smaller crops and their insecticide registration problems, even though some methods are now underway to provide registrations for them.

3. *The apparent reduction in economic entomology research by most State and Federal groups.* I want to stress that this section refers to applied chemical testing on various pests and crops. The National Science Foundation grants and other similar ones have given great impetus to basic research at the expense of applied research. There is also a great deal of emphasis placed on support for basic research papers that will qualify entomologists for their advancement in the academic system.

The young entomologist who wants to get ahead cannot be blamed for wanting to do his research in a laboratory under controlled conditions on problems that will give him definitive papers leading to ad-

vanced degrees or promotions within his department. But this attribute does seriously detract from his usefulness to applied entomology.

4. *The shortage of trained entomologists for industrial research and development work.* Of course this shortage is found in the public area too, consequently another reason for less applied work lies simply in the fact that there are not enough people to attack the problem.

We have also seen in areas of the West a trend away from experimental stations. This trend has had a great impact on the degree of applied work for the simple reason that the entomologist of ten years ago who was assigned to an experiment station worked primarily on the problems of his pest or crop. He was not diverted by teaching and academic duties of routine nature. As his school or station became a teaching institution as well as a research station, he found himself having to assume these additional duties that were not always productive on a day-to-day basis and that obviously took time from what he had previously been doing.

5. *Shortage of technically trained sales personnel.* There is a real need to upgrade the caliber of man that contacts and makes recommendations to the ultimate pesticide user. This man needs a solid background in agriculture, preferably with a degree in entomology or related sciences. The shortage of these good men is very apparent in the market place of manpower, namely the college and university. Also, many men go on to advanced degrees, feeling this will greatly improve their job bargaining power. This can help them at times, but we do see many good sales-oriented people missing their true calling in agricultural sales. No longer is agricultural sales a pitchman's game; the salesman must have the technical know-how or he soon becomes an albatross around the neck of his company.

6. *A general lag in State and Federal recommendations for the use of pesticides*

in relation to their availability to the consumer farmer. This lag in most instances is related to the shortage of or decreased emphasis on applied chemical testing. Now I am fully aware this statement does not apply to every State or situation, but industry feels the pinch in this phase more each year and in more areas. This detracts from the university or extension prestige and puts almost too much burden on industry's responsibility for realistic pest control.

7. *The steady growth of distribution and regulatory restrictions at all levels of government from county to Federal.* We in the West have seen this growth coming on strongly for many years, as California has had an active county regulatory force for many years. This regulation in most cases is good; it weeds out or controls problem-making industrial companies or individuals—and we have had a few! Most legitimate problems can be overcome, but it takes time, money, and more effort than ever to cut through the red tape. This area definitely needs streamlining and modernizing.

8. *The apparent short life of most pesticides.* Not too much short-term help can be given this problem. We need to find the best uses for our many pesticides and try to build into them as much long-life usefulness as we possibly can.

There are, of course, many reasons for the short life aspect, most prominent of which is insect resistance. I doubt very much if this is the most controversial of our problems because we realize that basic research is the only answer to lengthen the life of pesticides through judicious integrated control. The modern farm practices are doing much to outmode certain chemicals quickly, and at this point this fact needs to be kept in mind for future recommendations as well.

9. *A communication gap.* We in industry desperately need better communications and intelligence from the State and

Federal research groups, not only to help us develop logical and sound use patterns for our pesticides, but to inspire us into new and potentially productive research areas for compounds that could change the entire pattern of pest control. The research entomologists must communicate to and inspire industrial research in entirely new avenues of endeavor.

10. *Industry has a responsibility of making pest control work but very little voice in the official recommendations of university, State, or Federal entomologists.* This is one area I shall develop later in my discussion because I feel it is of tremendous importance and has great potential.

These are only ten of our many problems and not everyone would agree they are the most important. But where are we headed and what is industry's future? I may in one breath sound pessimistic, but never let it be said that I'm not optimistic that these problems cannot be overcome. It may take some new tactics to accomplish this, but it can, must, and will be done!

A few of the remedies as I see them can be best summed up in the following points:

1. We need the support of all entomology departments to help train and guide promising young men into industrial research, development, and technical service work. Industry has the facilities and problems to challenge the most gregarious of young men. The teaching institutions can help immensely by permitting us to talk to undergraduate or graduate students to tell the story of our respective companies. It might even be considered part of a course or curriculum during one of the decision-making years of the student's university life. It does not have to take on the cold-blooded aspect of pure recruiting.

2. There is a need to streamline the insecticide registration process and develop clear-cut positive guidelines as to the needed data for registration. There must be ac-

tion on pending registrations at specific time intervals. The cost of carrying a program through another year with very little definitive information on what is lacking or inadequate in a pending registration is a tremendous source of financial loss to industry. Industry will continue to be as productive as in the past but only as long as the incentive is available.

3. The States should set forth positive applied research programs each year or span of years, so that industry can look to them as guidelines of emphasis.

4. University extension departments should direct their communication efforts toward the groups that will be most influential to the ultimate chemical user. A group of studies in the Midwest and California has shown that no longer do the university extension people and county agents have the prime influence on farmer decisions; rather, the influence lies with the industry salesman. Doesn't this fact indicate a need for extension to gear its efforts more toward convincing these men that the stories and data of good research can be properly utilized in influencing the grower decisions? Doesn't this indicate a need for extension to extend efforts toward convincing these men that the story and data of good research can be properly utilized to influence the growers?

5. We must narrow the gap between time of registration of pesticides and the time the pesticides are recommended by State or Federal extension personnel. The time lag is often as high as 5 years.

6. Let's streamline the local regulatory process and try for more conformation to the national laws. Our nation is really very small, relatively speaking, and there are adequate Federal laws now to handle most situations.

7. Build a stronger and more useful agricultural chemical association that can help relate our problems and advantages to the concerned public. We are now too weak in this area and tend to talk to ourselves too much.

8. Industry and extension need to have a common meeting ground for the development of sound workable recommendations. The State extension groups could take a strong lead in this area by developing an agricultural pest control steering committee utilizing some industry personnel. They should meet at least twice a year with the university extension people to seriously work on the official recommendations. Industry does not need a vote, but it should be listened to and considered because it is directly charged by the grower to provide adequate pest control. Not always are the official recommendations practical for the day-to-day field control program. This sounding board will also serve other purposes such as a better understanding between the two groups and an avenue to communicate urgent problems to industrial research for consideration.

9. The grower, through individual and organizational efforts, should insist upon a fair support for research at the university, state, and Federal level. The professional entomologists have great difficulty in influencing their legislatures to provide them adequate funds for the nebulous task of insect control. We have seen time and time again in many areas of the country that legislatures have cut budgets to the bare minimum, claiming that the primary duty is to teach students, not to conduct research that would profit industry. We all know this is short-sighted of our legislative system, but it is a reality of life, and the only people who can seriously influence this area are the large grower-consumer groups in this nation. This is another area of professional communication—the necessity to develop hard-hitting facts that will support the obvious need for good applied research is inescapable.

In closing I mention an excerpt from a recent speech by Dr. Warren Shaw, USDA, that I feel states rather explicitly the need for pesticides and realistic approaches to the production of food:

"The use of pesticides is generally the most effective and in many instances the only available method to control weeds, insects, nematodes, and diseases. In some instances, pest-resistant crop varieties are the only means of control. However, pesticides and non-chemical methods of control are usually most effective when combined in an integrated systems approach with other good crop production practices.

The use of pesticides has accounted for 10 to 15 per cent of the increase in farm output since 1940. They also are responsible for \$2-2.5 billion of the annual savings in production resources. We should also consider the consequences of the complete withdrawal of pesticides now used in agricultural production. Sound

unreasonable? Yes. But there are some who advocate just such action. Total output of crops and livestock combined would be reduced by about 30 per cent. Farm exports would be eliminated and the price of farm products would increase 50 to 75 per cent."

These are grave and thought-provoking words. Let's hope we can always reason together to avert such a calamity. Gentlemen, I submit these few items for your consideration, but with all the problems and the future well-being of this science and our industry, I consider the area of communication most important and potentially fruitful. There are no problems or circumstances that cannot be overcome if we reveal and communicate our thoughts and ideas for appropriate review and action.

